Rana University
Faculty of Science
Computer Science Department

Course Title	**Cloud Computing**
Lecturer Name	**Baitullah Paktin**
Credit Hours	**4**
Lecture Days	**Sunday-Monday**
Lecture Timing	**Early Morning**
Class No.	**609**

Course Description

The Cloud Computing course cover the main concepts, terminologies, network & security deployment mechanisms, virtualizations, hypervisors and types of cloud computing. The idea is to equip the students with the knowledge of the cloud computing and enable them to build a sample cloud computing environment using their own laptops. The private and public cloud along with the most famous Cloud Service Providers (CSP) will also be described in details.

Course Objective

This course investigates cloud computing models, techniques, and architectures. Cloud computing has evolved as a very important computing model, which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. Students will be exposed to the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, security and privacy issues, performance and systems issues, capacity planning, disaster recovery, Cloud OS, challenges in implementing clouds, data centers, hypervisor CPU and memory management, cloud hosted applications, and other advanced and research topics in cloud computing. Farther more we will also cover cluster concept and implementation. Course work will include homework assignments, presentations, and a term project that will provide exposure to scientific research in cloud computing. Material may be covered from sources other than the text including research papers.

Teaching Method

- Lecture/Explanation/short notes
- Previous lesson’s review
- Discussion

- Questioning
    - Hands-on/Inquiry
- Presentations
    - Cooperative groups
    - Other _____

Learning Outcome

:By the end of the course, students will be able to
.Describe the several types of computing .1
,Define and elaborate the computing models as SAAS PAAS IAAS .2
Illustrate the characteristics, deployment models and the applications of cloud .3
.computing
.Understand the cloud architecture along with its layers .4
.Understanding the cloud migration .5
Describe the approaches of migration .6
.Describe the virtualization along with its types .7
.Analyze the networking issues in Data Centers .8
.Understand the TCP Impairments in DCNs .9
.Describe the cloud platform and storage .10
.be familiar with Amazon Web services .11
.Understand the security in cloud computing .13
.Have the concept of Clustering .14

Course Plan

Weeks	Chapters	Teaching Method	Remarks
1	Chapter 1 – Computing paradigm - High-Performance Computing - Parallel Computing - Distributed Computing - Cluster Computing - Grid Computing Cloud Computing	Theory	Homework
2	**Chapter 2 Cloud Computing Fundamentals** - The Need for Cloud Computing - Defining Cloud Computing - NIST Definition of Cloud Computing - Cloud Computing Is a Service - Cloud Computing Is a Platform Principles of Cloud computing	Theory	Homework
3	**Chapter 2 Cloud Computing Fundamentals:** - Five Essential Characteristics - Four Cloud Deployment Models - Three Service Offering Models - Requirements for Cloud Services Cloud Application	Theory	Homework
4	**Telnet & SSH:** **Chapter 3 – Cloud Computing**	Theory	Homework

	Architecture and Management - Cloud Architecture - Layer 1 (User/Client Layer) - Layer 2 (Network Layer) - Layer 3 (Cloud Management Layer) Layer 4 (Hardware Resource Layer)		
5	**Chapter 3 (continued):** - Migrating Application to Cloud Approaches for Cloud Migration	Theory	Homework
6	**Chapter 4 Cloud Deployment Models** - Introduction - Private Cloud - On-Premise Private Cloud - Outsourced Private Cloud - Public cloud - Hybrid cloud Community cloud	Theory	Homework
7	**Chapter 5 – Cloud Service Models.** - Introduction - Infrastructure as a Service - Platform as a Service Software as a Service	Theory	Homework
8	**Chapter 6 Virtualization** - Virtualization - Approaches in Virtualization - Full Virtualization Para virtualization	Theory	Homework
	Mid-Term Exam		
9	**Chapter 6 (continued)** - Hypervisor and Its Role - Types of Virtualization - OS Virtualization - Server Virtualization - Memory Virtualization - Storage Virtualization - Network Virtualization Application Virtualization	Theory	Homework
10	**Chapter 10 – Networking for Cloud Computing** - Introduction - Overview of Data Center Environment - Architecture of Classical Data Centers - Storage and Networking Infrastructure Networking Issues in Data Centers	Theory	Homework
11	**Chapter 10 – (continue)** - Transport Layer Issues in DCNs	Theory	Homework

	- TCP Impairments in DCNs o TCP Incast o TCP Outcast o Queue Buildup o Buffer Pressure - TCP Enhancements for DCNs - TCP with Fine-Grained RTO (FG-RTO TCP with FG-RTO + Delayed ACKs Disabled **Chapter 11 – Cloud Service Providers** - Google o Cloud Platform o Cloud Storage o Google Cloud Connect o Google Cloud Print o Google App Engine		
12	- Amazon Web Services o Amazon Elastic Compute Cloud o Amazon Simple Storage Service o Amazon Simple Queue Service - Microsoft - Windows Azure - IBM o Cloud Models o IBM SmartCloud - Salesforce Rackspace	Theory	Homework
13	**Chapter 12 Security in Cloud Computing** - Cloud General Challenges - Security Aspects o Data Security o Access Control o Encryption and Decryption o Virtualization Security Network Security	Theory	Homework
14	**Chapter 12 – (Continue)** - Software-as-a-Service Security Issues - Platform-as-a-Service Security Issues Infrastructure-as-a-Service Security Issues	Theory	Homework
15	**Clustering** - Purpose of Clustering - Cluster components - Major type of cluster o -Storage o -High availability	Theory	Homework

	o -Load balancing o -High performance - Clustering functionality Cluster share volumes		
16	**A Sample Practice:** Creating a private cloud service provide (CSP) infrastructure using a single laptop with the open source tools like OpenStack and CloudStack		Homework
Reference	▪ Cloud Computing Principals and Paradigms		

Class Discipline

To maintain control and manage the classroom properly I'm applying the following rules and discipline in my classes.

- Trying to include rules on my syllabus.
- Talk about my rules on the first day of class
- Trying to know students by name.
- Trying to act professionally.
- Exploring the discipline issue before acting.

Assessment Method

A useful beginning point in determining the optimum mix of assessment methods is the resources and I select the

Following assessment method.

- Independent Work
- Guided Instruction
  - Practice Sheets
- Project/Presentation
  - Conference with students
  - Test/Quiz
  - Other _____

Exam Method

Not allowing the students to whisper during the exam. (if catcht the place will be -changed)

.Cheating by any means the paper will be canceled -

.Not allowing to use cell phone, mobile, tablets …etc-

.Exam will be conducted written -

Prepared by:

Approved by

Baitullah Paktin

Fardin